EMULEX IUC41F
CS41F VAX INSTALLATION AND VERIFICATION
DIAGNOSTIC

EMULEX

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VX9950919 REV A
February, 1986

This diagnostic distribution kit contains the following diagnostic distribution media:

Emulex Part Number	Type of Media	Partial Contents
VX9960402	TU58 for 11/730, 11/750	EVM.EXE IUC41F.EXE
VX9960502	Floppy for 11/780	EVM.EXE IUC41F.EXE

This kit contains the following User's Manuals to document the programs contained on the distribution media:

Title: Emulex VAX Monitor (EVM) User's Guide
Publication Number: VX9950901

Title: VAX Configuration Utility (IVV000) User's Guide
Publication Number: VX9950905

Title: CS41F Communications Subsystem Technical Manual
Publication Number: CS4151001

Title: T1/24A Distribution Panel Technical Manual
Publication Number: CP4151001

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EMULEX PRODUCT WARRANTY

SOFTWARE WARRANTY: Emulex warrants for a period of ninety (90) days, either from the date of installation or thirty (30) days after shipment, which ever comes first, that each software package supplied shall be free from defects and shall operate according to Emulex specifications under those Digital Equipment Corporation ("DEC") operating system versions supported by Emulex. Emulex does not warrant its software products under any operating system which has not been specifically identified. Any software revisions required hereunder will cover supply of distribution media only and will not cover on-site installation of integration.

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1.1 INTRODUCTION

This manual is designed to serve as a guide for those using Emulex's IUC41F Installation and Verification Diagnostic for Digital Equipment Corporation (DEC) VAX 11/7xx series computers. IUC41F runs under the control of Emulex VAX Monitor (EVM) and is designed for the CS41F communications subsystem.

These diagnostics are designed for use by qualified installers of Emulex equipment, and thus assume that the user has some knowledge of hardware configurations, VAX architecture and terminology, and interpretation of error messages and device register contents.

This document contains three sections:

Section 1   **General Description.** This section provides an overview of Emulex's IUC41F Installation and Verification Diagnostic, including its functions, distribution media, hardware and software requirements, and related documentation.

Section 2   **Operation.** This section describes the operation of IUC41F Installation and Verification Diagnostic, including configuration, and loading and startup procedures.

Section 3   **Service.** This section explains Emulex service policies.

1.2 PRODUCT OVERVIEW

The IUC41F Installation and Verification Diagnostic performs 26 different tests which ensure integrity and give the customer confidence in the performance of the CS41F communications subsystem. IUC41F tests one CS41F subsystem at a time, up to 18 DMF emulations, which is the maximum capacity of the subsystem. The HELP command, described in the EVM User's Guide, can be used to display a description of each of the 26 diagnostic tests run by IUC41F. Test descriptions appear in section 1.6.

The following subsections further describe the program and its features.

1.2.1 AUTOSIZER

IUC41F incorporates an autosizer that determines the location and number of DMF emulations on the UNIBUS during its search of the I/O address page. The autosizer determines if the DMF emulations are CS41Fs and, if so, further sizing is performed to determine the T1 link configuration(s) and status.

The operator has the ability to use the autosizer's "search for CC41 base address" feature or use the previously entered CSR address per the standard EVM SET CONFIG command. This feature is implemented in the event more than eighteen DMF emulations exist in the system (indicating that there is more than one CS41F T1 link). To test a subsequent CS41F, configure EVM's CSR (SET CONFIG/CSR:) for the base address of the device to be tested. **Ensure that IUC41F is configured for the base CC41 address,** otherwise the diagnostic will abort after displaying a message indicating it did not locate any CC41 addresses.

1.2.2 LOOPBACK MODES

The IUC41F program is an installation and verification diagnostic that can be run with or without loopback connectors. With loopback connectors installed on the CP41 distribution panels, the entire subsystem is tested, from the UNIBUS transceivers to the distribution panel input/output lines. If internal loopback is selected and the T1 link is operative, then the data is looped back internally within the CP41 distribution panel. There are four possible loopback situations:

- <u>External Loopback (one-to-one)</u>
  This mode requires one EIA wrap-around connector installed on the CP41 distribution panel for each selected line. The T1 link must be operative for this mode to function properly.

- <u>External Loopback (staggered)</u>
  This mode requires one staggered loopback connector installed on the CP41 distribution panel for each selected line pair. The T1 link must be operative for this mode to function properly.

- <u>Internal Loopback (T1 Link Operative)</u>
  This mode requires no loopback connectors. The T1 link must be operative for this mode to function properly, as the data loops back internally within the CP41.

- <u>Internal Loopback (T1 Link Inoperative)</u>
  This mode requires no loopback connectors. Switch 3, position 6, **MUST be OPEN** in order for the data to be looped back internally within the CT41. Return the switch to its normally **CLOSED** or "ON" position when testing in this mode is completed. Refer to the CS41F Communications Subsystem Technical Manual for further information.

The operator has the ability to test the CS41F in internal or external loopback mode. If external loopback mode is selected, the operator may select one-for-one connectors (each Tx connected to its Rx) or staggered connectors (odd-to-odd and even-to-even). An example of the staggered loopback pairs for a DMF emulation:

0-2, 1-3, 4-6, 5-7

An example of the staggered loopback pairs for a 24 line CP41 panel:

```
  0-2,   1-3,   4-6,   5-7,
 8-10,  9-11, 12-14, 13-15,
16-18, 17-19, 20-22, 21-23
```

Selection of the external loopback mode requires placement of loopback (wrap) connectors on all selected lines (See Appendix A for more information concerning loopback connectors). The emulation masks and line masks are used to select specific lines, which are explained in greater detail in the Operation section (Startup Procedure, paragraph 2.2.2). All tests can run in internal or external loopback mode with the exception of the Parity Bit, Split Baud Rate, Auto Echo, Auto Xon/Xoff and Modem Signals tests. These tests can only run in external mode and thus require loopback connectors. Further, the Parity Bit, Split Baud Rate, Auto Echo and Auto Xon/Xoff tests require the external loopback connectors to be of the staggered variety.

NOTE

If the proper loopback mode and/or the proper loopback connections are not made, the diagnostic will display a message indicating that the test(s) were skipped.

1.3 DISTRIBUTION MEDIA

Table 1-1 lists and describes distribution media for IUC41F.

Table 1-1. Distribution Media

Emulex Part Number	Type of Media	Partial Contents
VX9960402	TU58 for 11/730, 11/750	EVM.EXE IUC41F.EXE
VX9960502	Floppy for 11/780	EVM.EXE IUC41F.EXE

1.4 COMPATIBILITY

1.4.1 HARDWARE

IUC41F requires the following hardware:

- DEC VAX-11/730, 11/750, or 11/780

- Emulex CS41/F1 communications controller

- Wrap-around test connectors for loopback tests

It is possible to build test connectors for any Emulex distribution panel by strapping a DB25S connector (see Appendix A). The types of loopback connectors used with the IUC41F diagnostic are listed below.

Emulex Part Number	Description
CU4111206	Staggered Loopback Connector
CU4110201	EIA Wrap-Around Connector

One DMF emulation (which is equivalent to eight lines) can be tested at a time with eight connectors. The operator selects the lines to be tested by responding to the IUC41F line mask prompt as explained in subsection 2.2.3.2.

1.4.2 SOFTWARE

IUC41F is designed to run with the Emulex VAX diagnostic monitor, EVM. For information on EVM, see the EVM User's Guide referenced in subsection 1.5.

1.5 RELATED DOCUMENTATION

Documents listed in this subsection can be ordered from the following address:

```
Emulex Corporation
3545 Harbor Boulevard
Costa Mesa, CA  92626
(714) 662-5600  TWX 910-595-2521
(800)854-7112 Outside of California Only
```

Title:	Emulex VAX Monitor (EVM) User's Guide
Publication Number:	VX9950901

Title:	VAX Configuration Utility (IVV000) User's Guide
Publication Number:	VX9950905

Title:	CS41F Communications Subsystem Technical Manual
Publication Number:	CS4151001

Title:	T1/24A Distribution Panel Technical Manual
Publication Number:	CP4151001

1.6 DIAGNOSTIC TESTS

The following is a list of the tests performed by the IUC41F
Installation and Verification Diagnostic:

```
TEST 01 - MASTER RESET & REGISTER ADDRESSABILITY
TEST 02 - Tx ENABLE, Tx READY, Tx SILO
TEST 03 - Rx ENABLE, Rx READY, Rx DATA
TEST 04 - CHARACTER LENGTH
TEST 05 - STOP BIT
TEST 06 - PARITY_BIT (STAGGERED LOOPBACK ONLY)
TEST 07 - LOAD WORD
TEST 08 - FLUSH SILO
TEST 09 - PREEMPT
TEST 10 - Tx BREAK
TEST 11 - Tx INTERRUPT
TEST 12 - Rx INTERRUPT
TEST 13 - MULTIPLE INTERRUPTS
TEST 14 - DMA DATA TRANSFER
TEST 15 - DMA DATA TRANSFER (NXM DETECTION)
TEST 16 - DMA DATA TRANSFER (ODD ADDRESS)
TEST 17 - DMA DATA TRANSFER (MEMORY EXTENSION)
TEST 18 - SPLIT BAUD RATE (STAGGERED LOOPBACK ONLY)
TEST 19 - AUTO ECHO MODE (STAGGERED LOOPBACK ONLY)
TEST 20 - AUTO XON/XOFF (STAGGERED LOOPBACK ONLY)
TEST 21 - MODEM SIGNALS (EXTERNAL LOOPBACK ONLY)
TEST 22 - DYNAMIC BAUD RATE
TEST 23 - DYNAMIC BREAK
TEST 24 - DATA INTEGRITY
TEST 25 - TERMINAL TRANSMIT (MANUAL INTERVENTION REQUIRED)
TEST 26 - TERMINAL ECHO (MANUAL INTERVENTION REQUIRED)
```

There are two manual intervention tests included in IUC41F. These
tests are the TERMINAL TRANSMIT (Test #25) and TERMINAL ECHO (Test
#26) tests. The TRANSMIT test transmits the familiar "barber-pole"
pattern to selected lines. The ECHO test echoes a Rx character from
selected lines. Both tests prompt the operator for line parameter
information such as baud rate, parity, etc. If these tests are not
implicitly selected , i.e., **START/TEST:25**, IUC41F skips these tests
and indicates that it has done so.

Diagnostic Tests

The following subsections contain detailed descriptions of the tests:

1.6.1 TEST 01 - MASTER RESET & REGISTER ADDRESSABILITY

This test verifies that each DMF emulation register set is uniquely addressable and returns to the proper state after Master Reset is issued.

1.6.2 TEST 02 - TX SILO TEST

This test verifies that the transmit silo count register increments properly when data is written into it. The Tx_SILO_CNT should return to zero and set Tx_RDY after data is transferred.

1.6.3 TEST 03 - RX ENABLE, RX READY, RX DATA TEST

This test verifies that the Rx Enable bit and Rx Ready flag perform properly. It checks received data for validity.

1.6.4 TEST 04 - CHARACTER LENGTH TEST

This test verifies that all lines can transmit five, six, seven, and eight-bit characters at 1200 baud.

1.6.5 TEST 05 - STOP BIT TEST

This test checks that all lines can be set for one or two stop-bits.

1.6.6 TEST 06 - PARITY BIT TEST (STAGGERED LOOPBACK ONLY)

This test verifies that the CS41F will flag a parity error when the Tx and Rx are set for different parity.

1.6.7 TEST 07 - LOAD WORD TEST

This test verifies that two characters can be loaded into the transmit silo. The diagnostic reads back the data to check its validity.

1.6.8 TEST 08 - FLUSH SILO TEST

This test verifies that the setting of the FLUSH.SILO flag in the LCR zeros out the contents of the selected Tx silo.

1.6.9 TEST 09 - PREEMPT TEST

This test verifies that setting of the Preempt bit halts transmission. When another character is written into the same transmit silo, transmission resumes without loss of characters.

1.6.10 TEST 10 - TX BREAK

This test verifies that when the Break bit is set in the LCR, the Tx line will be held at an RS232 spacing level. The corresponding Rx line detects spacing errors and framing errors.

1.6.11 TEST 11 - TX INTERRUPT

This test verifies that the CS41F will interrupt when the transmit silo is empty. A transmit interrupt request occurs when Tx_RDY is set and Tx_IE is enabled. The vector and BR level are verified.

1.6.12 TEST 12 - RX INTERRUPT

This test verifies that a receive interrupt will be generated when data is in the receive silo and Rx_IE is set. The vector is verified.

1.6.13 TEST 13 - MULTIPLE INTERRUPTS

This test verifies that the receive interrupt takes precedence over a transmit interrupt when both interrupts occur simultaneously.

1.6.14 TEST 14 - DMA DATA TRANSFER

This test verifies correct completion of DMA transfers by verifying character count and data.

1.6.15 TEST 15 - DMA DATA TRANSFER (NXM DETECTION)

This test verifies detection of a DMA NXM error when a DMA read is made of nonexistent memory.

1.6.16 TEST 16 - DMA DATA TRANSFER (ODD ADDRESS)

This test verifies DMA transfers using an odd boundary starting address.

1.6.17 TEST 17 - DMA DATA TRANSFER (MEMORY EXTENSION)

This test verifies successful completion of a DMA transfer by using UNIBUS extended address bits 16 and 17 as defined in the Byte Count Register bits 15:14.

1.6.18 TEST 18 - SPLIT BAUD RATE (STAGGERED LOOPBACK ONLY)

This test verifies split baud rate operation by checking the integrity of the data. The first selected staggered TX-RX line pair of each emulation transmits and receives one character at all possible baud rates.

1.6.19 TEST 19 - AUTO ECHO MODE (STAGGERED LOOPBACK ONLY)

This test checks auto echo mode by transmitting one character to a receiver enabled with the Auto-Echo feature. It re-transmits the received character to the transmitting line via the external staggered loopback path. It then checks the RX silo for both characters.

1.6.20 TEST 20 - AUTO XON/XOFF (STAGGERED LOOPBACK ONLY)

This test verifies that when the Auto XON/XOFF bit (LCR Bit 01) is set, the receipt of an XOFF causes the Tx for the line under test to be disabled, and the XOFF is entered in the Rx silo. The receipt of an XON should then cause the Tx line under test to be re-enabled and the XON to be entered in the Rx silo.

1.6.21 TEST 21 - MODEM SIGNALS (EXTERNAL LOOPBACK ONLY)

This test verifies that outbound modem signals cause inbound modem signals to change state per the following chart:

OUTBOUND	INBOUND
DTR	DCD & RING
RTS	CTS & DSR

It also verifies that the setting of DATA SET CHANGE DETECT ENABLE (INDR8 bit 05) causes the CS41F to respond with DATA SET CHANGE (RBR Bit 11) and an entry in the RX silo.

1.6.22 TEST 22 - DYNAMIC BAUD RATE

This test transfers data on all eight lines of one DMF emulation concurrently. One line is set for a random baud rate while the remaining lines are set at 9600 baud. The test repeats until each of the eight lines have been run at a random baud rate.

1.6.23 TEST 23 - DYNAMIC BREAK

This test verifies that with the Break bit of all lines of all emulations set (except for the line under test), the line under test can Tx and Rx data error free. This tests the Tl interface in a worst case mode.

1.6.24 TEST 24 - DATA INTEGRITY TEST

This test transmits 32 characters per selected line of one emulation concurrently to check for interaction errors.

1.6.25 TEST 25 - TERMINAL TRANSMIT (MANUAL INTERVENTION REQUIRED)

IUC41F bypasses this test unless the user specifically requests it using the start command, i.e., START/TEST 25. This test allows the operator to test the data path, from the UNIBUS through the Tl link to the terminal. It transmits the alphabet to a selected line. The test requests the operator to select the line parameter information (baud rate, parity, etc.) for the selected line(s). Lines are selected/deselected using the line mask.

1.6.26 TEST 26 - TERMINAL ECHO (MANUAL INTERVENTION REQUIRED)

IUC41F bypasses this test unless the user specifically requests it using the start command, i.e., START/TEST 26. This test allows the operator to test the entire data path, from the terminal through the Tl link to the UNIBUS, and back again from the UNIBUS through the Tl link to the terminal. When prompted, the operator selects the line parameter information (baud rate, parity, etc) for the selected line(s). All lines of all emulations will have their receivers enabled according to the line selection mask so that in the event of errors, the emulation and line number in error will be displayed on the console.

NOTE:

> Tests 25 and 26 do not require a loopback mode selection. Even though IUC41F asks for the loopback mode, it ignores the user's response.

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2.1 OVERVIEW

This section describes load and start procedures and provides a sample printout of the diagnostic program run. The sample printout is followed by a detailed description of the diagnostic displays and a discussion of start-up.

Operator responses to IUC41F prompts appear in **bold** print. The symbol **<return>** indicates the carriage return key.

As used in prompts, the abbreviation DEC signifies decimal radix rather than Digital Equipment Corporation. Prompts for numeric parameters include the minimum and maximum acceptable values, followed by the default value in parentheses. The following example illustrates these conventions:

     Your selection ? [DEC - 1, 3, (1)]>>> **3<return>**

For information regarding EVM command syntax, see the EVM User's Guide.

2.2 LOAD AND START PROCEDURES

2.2.1 CONFIGURATION

The sample printout of the diagnostic program run which appears in Section 2.2.3.1 reflects the following hardware configuration:

1. There is one CC41 controller set for base UNIBUS address **760340** and 18 DMF emulations (144 total lines).
2. There are six CP41 panels (144 lines total).
3. The CP41 panels are configured for FULL modem control.
4. The CC41 node is the primary node, frame master, and T1 clock source.
5. The CC41 node address is 0 (ZERO).

2.2.2 LOAD PROCEDURE

The procedure used to invoke EVM varies from one VAX system to another. For a description of EVM bootstrapping procedures, see the EVM User's Guide.

After the EVM> prompt has appeared on the screen, type the following:

     EVM>**LOAD IUC41F.EXE<return>**

The LOAD statement may be followed by a SET CONFIGURATION statement,

the content of which depends upon the VAX system being used. Sample configure statements for the VAX-11/730, 11-750, and 11-780 are presented in the following subsections.

2.2.2.1   Sample Configure Statement For VAX-11/730

The following example refers to a VAX-11/730 with one CS41F at CSR address 760340 and vector 300:

```
EVM>LOAD IUC41F.EXE<return>
EVM>SET CONFIG/CSR:760340/VECTOR:300<return>
```

The values shown for CSR and VECTOR are the default values and need not be entered, unless there are two or more CS41Fs with more than 18 emulations (144) lines, and you wish to test beyond the first 18 emulations. In this case, specify the starting CSR for the CS41F to be tested.

2.2.2.2   Sample Configure Statement For VAX-11/750

The following example refers to a VAX/11-750 with one CS41F at CSR address 760340, vector 300, UNIBUS adapter UBA0 (base address FC0000), and device BR level 4:

```
EVM>LOAD IUC41F.EXE<return>
EVM>SET CONFIG/CSR:760340/VECTOR:300/ADAPTER:0/BR:4/UBR:5<return>
```

The values shown for CSR, VECTOR, ADAPTER, BR and UBR are the default values and need not be entered, unless there are two or more CS41Fs with more than 18 emulations (144 lines), and you wish to test beyond the first 18 emulations. In this case, specify the starting CSR for the CS41 to be tested.

Acceptable values for ADAPTER are 0 or 1 (0 is the default value):

```
ADAPTER #0        UBA0, FC0000
ADAPTER #1        UBA1, F30000
```

BR needs to be specified only if the BR level of the UNIBUS adapter is other than 4. Acceptable values for BR are 4 through 7. Four is the default for UNIBUS adapters.

UBR needs to be specified only if the device BR level is other than 5. Acceptable values for UBR are 4 through 7. Five is the default for all Unibus devices.

2.2.2.3   Sample Configure Statement For VAX-11/780

The following example refers to a VAX-11/780 with the same configuration as the 11/750 in the previous example. UBA0 corresponds to TR 3:

```
EVM>LOAD IUC41F.EXE<return>
EVM>SET CONFIG/CSR:760340/VECTOR:300/TR:3/BR:4/UBR:5<return>
```

The values shown for CSR, VECTOR, TR, BR and UBR are the default
values and need not be entered unless there are two or more CS41Fs or
more than 18 emulations (144 lines), and you wish to test beyond the
first 18 emulations. In this case, specify the starting CSR for the
CS41F to be tested. Valid values for this TR are 3 through 6, with 3
the default:

```
        TR  3      UBA0, 20100000
        TR  4      UBA1, 20140000
        TR  5      UBA2, 20180000
        TR  6      UBA3, 201C0000
```

BR needs to be specified only if the BR level of the UNIBUS adapter
is other than 4. Acceptable values for BR are 4 through 7. Four is
the default for UNIBUS adapters.

UBR needs to be specified only if the device BR level is other than
5. Acceptable values for UBR are 4 through 7. Five is the default
for all Unibus devices.

After entering the LOAD and SET CONFIGURATION statements to load and
configure IUC41, the operator may start the tests as shown in the
following example. Note that the displays are formatted with only 24
lines of data per page. For the sake of clarity, the prompt "TYPE
<RETURN> FOR MORE" won't be shown.

2.2.3 START PROCEDURE

2.2.3.1 Sample Diagnostic Program Run

The following depicts a sample printout of the diagnostic program run.
For a detailed description of the start procedure see section 2.2.3.2.

```
EVM> START<return>

IUC41F
EMULEX VAX-UNIBUS CS41F INSTALLATION AND VERIFICATION DIAGNOSTIC
REV Vn.m dd-mmm-yyyy time

Searching for NXM, please wait...
```

This diagnostic uses an autosizer to locate all DMF's on the
selected UBA, beginning with location 760000 (octal). The
diagnostic will only test the first 18 CS41F DMF emulations the
autosizer locates, which is the maximum for one Tl link (144
lines). You may alter the address at which the autosizer starts
its search by entering a value with the EVM "SET CONFIG/CSR:"
command and answering "Yes" to the following question.

Do you wish to begin the search using the value input with the EVM
"SET CONFIG/CSR:" command?   (If not, search begins at 760000)
[Y,N,(N)]>>><return>

Autosizing in progress, please wait...
Autosizing completed

Do you wish to display the autosize map ? [Y,N,(N)]>>> Y<return>

These are the CS41F DMF register sets that were located:

DMF ADDRESS = 760340 (CC41 BASE ADDRESS)
FIRMWARE REV LEVEL = 001
CC41 UNIT # 0

DMF EMULATION	#000	LINE #	0	1	2	3	4	5	6	7
T1 NODE ADDRESS	#000	CHANNEL #	0	1	2	3	4	5	6	7
MODEM CONTROL AVAILABLE [Y,N]			Y	Y	Y	Y	Y	Y	Y	Y
S(elected)/D(eselected)			S	S	S	S	S	S	S	S

DMF ADDRESS = 760400
CC41 UNIT # 0

DMF EMULATION	#001	LINE #	0	1	2	3	4	5	6	7
T1 NODE ADDRESS	#000	CHANNEL #	8	9	10	11	12	13	14	15
MODEM CONTROL AVAILABLE [Y,N]			Y	Y	Y	Y	Y	Y	Y	Y
S(elected)/D(eselected)			S	S	S	S	S	S	S	S

DMF ADDRESS = 760440
CC41 UNIT # 0

DMF EMULATION	#002	LINE #	0	1	2	3	4	5	6	7
T1 NODE ADDRESS	#000	CHANNEL #	16	17	18	19	20	21	22	23
MODEM CONTROL AVAILABLE [Y,N]			Y	Y	Y	Y	Y	Y	Y	Y
S(elected)/D(eselected)			S	S	S	S	S	S	S	S

DMF ADDRESS = 760500
CC41 UNIT # 0

DMF EMULATION	#003	LINE #	0	1	2	3	4	5	6	7
T1 NODE ADDRESS	#024	CHANNEL #	0	1	2	3	4	5	6	7
MODEM CONTROL AVAILABLE [Y,N]			Y	Y	Y	Y	Y	Y	Y	Y
S(elected)/D(eselected)			S	S	S	S	S	S	S	S

DMF ADDRESS = 760540
CC41 UNIT # 0

DMF EMULATION	#004	LINE #	0	1	2	3	4	5	6	7
T1 NODE ADDRESS	#024	CHANNEL #	8	9	10	11	12	13	14	15
MODEM CONTROL AVAILABLE [Y,N]			Y	Y	Y	Y	Y	Y	Y	Y
S(elected)/D(eselected)			S	S	S	S	S	S	S	S

DMF ADDRESS = 760600
CC41 UNIT # 0

DMF EMULATION	#005	LINE #	0	1	2	3	4	5	6	7
T1 NODE ADDRESS	#024	CHANNEL #	16	17	18	19	20	21	22	23
MODEM CONTROL AVAILABLE [Y,N]			Y	Y	Y	Y	Y	Y	Y	Y
S(elected)/D(eselected)			S	S	S	S	S	S	S	S

```
DMF ADDRESS = 760640
CC41 UNIT # 0
DMF EMULATION    #006     LINE #  0   1   2   3   4   5   6   7
T1 NODE ADDRESS  #048  CHANNEL #  0   1   2   3   4   5   6   7
MODEM CONTROL AVAILABLE [Y,N]      Y   Y   Y   Y   Y   Y   Y   Y
S(elected)/D(eselected)            S   S   S   S   S   S   S   S

DMF ADDRESS = 760700
CC41 UNIT # 0
DMF EMULATION    #007     LINE #  0   1   2   3   4   5   6   7
T1 NODE ADDRESS  #048  CHANNEL #  8   9  10  11  12  13  14  15
MODEM CONTROL AVAILABLE [Y,N]      Y   Y   Y   Y   Y   Y   Y   Y
S(elected)/D(eselected)            S   S   S   S   S   S   S   S

DMF ADDRESS = 760740
CC41 UNIT # 0
DMF EMULATION    #008     LINE #  0   1   2   3   4   5   6   7
T1 NODE ADDRESS  #048  CHANNEL # 16  17  18  19  20  21  22  23
MODEM CONTROL AVAILABLE [Y,N]      Y   Y   Y   Y   Y   Y   Y   Y
S(elected)/D(eselected)            S   S   S   S   S   S   S   S

DMF ADDRESS = 761000
CC41 UNIT # 0
DMF EMULATION    #009     LINE #  0   1   2   3   4   5   6   7
T1 NODE ADDRESS  #072  CHANNEL #  0   1   2   3   4   5   6   7
MODEM CONTROL AVAILABLE [Y,N]      Y   Y   Y   Y   Y   Y   Y   Y
S(elected)/D(eselected)            S   S   S   S   S   S   S   S

DMF ADDRESS = 761040
CC41 UNIT # 0
DMF EMULATION    #010     LINE #  0   1   2   3   4   5   6   7
T1 NODE ADDRESS  #072  CHANNEL #  8   9  10  11  12  13  14  15
MODEM CONTROL AVAILABLE [Y,N]      Y   Y   Y   Y   Y   Y   Y   Y
S(elected)/D(eselected)            S   S   S   S   S   S   S   S

DMF ADDRESS = 761100
CC41 UNIT # 0
DMF EMULATION    #011     LINE #  0   1   2   3   4   5   6   7
T1 NODE ADDRESS  #072  CHANNEL # 16  17  18  19  20  21  22  23
MODEM CONTROL AVAILABLE [Y,N]      Y   Y   Y   Y   Y   Y   Y   Y
S(elected)/D(eselected)            S   S   S   S   S   S   S   S

DMF ADDRESS = 761140
CC41 UNIT # 0
DMF EMULATION    #012     LINE #  0   1   2   3   4   5   6   7
T1 NODE ADDRESS  #096  CHANNEL #  0   1   2   3   4   5   6   7
MODEM CONTROL AVAILABLE [Y,N]      Y   Y   Y   Y   Y   Y   Y   Y
S(elected)/D(eselected)            S   S   S   S   S   S   S   S

DMF ADDRESS = 761200
CC41 UNIT # 0
DMF EMULATION    #013     LINE #  0   1   2   3   4   5   6   7
T1 NODE ADDRESS  #096  CHANNEL #  8   9  10  11  12  13  14  15
MODEM CONTROL AVAILABLE [Y,N]      Y   Y   Y   Y   Y   Y   Y   Y
S(elected)/D(eselected)            S   S   S   S   S   S   S   S
```

```
DMF ADDRESS = 761240
CC41 UNIT # 0
DMF EMULATION      #014      LINE #  0   1   2   3   4   5   6   7
T1 NODE ADDRESS    #096   CHANNEL # 16  17  18  19  20  21  22  23
MODEM CONTROL AVAILABLE [Y,N]      Y   Y   Y   Y   Y   Y   Y   Y
S(elected)/D(eselected)            S   S   S   S   S   S   S   S

DMF ADDRESS = 761300
CC41 UNIT # 0
DMF EMULATION      #015      LINE #  0   1   2   3   4   5   6   7
T1 NODE ADDRESS    #120   CHANNEL #  0   1   2   3   4   5   6   7
MODEM CONTROL AVAILABLE [Y,N]      Y   Y   Y   Y   Y   Y   Y   Y
S(elected)/D(eselected)            S   S   S   S   S   S   S   S

DMF ADDRESS = 761340
CC41 UNIT # 0
DMF EMULATION      #016      LINE #  0   1   2   3   4   5   6   7
T1 NODE ADDRESS    #120   CHANNEL #  8   9  10  11  12  13  14  15
MODEM CONTROL AVAILABLE [Y,N]      Y   Y   Y   Y   Y   Y   Y   Y
S(elected)/D(eselected)            S   S   S   S   S   S   S   S

DMF ADDRESS = 761400
CC41 UNIT # 0
DMF EMULATION      #017      LINE #  0   1   2   3   4   5   6   7
T1 NODE ADDRESS    #120   CHANNEL # 16  17  18  19  20  21  22  23
MODEM CONTROL AVAILABLE [Y,N]      Y   Y   Y   Y   Y   Y   Y   Y
S(elected)/D(eselected)            S   S   S   S   S   S   S   S
```

Do you wish to display T1 Node Parameters? [Y,N(N)]>>> **Y<return>**

This is the T1 node map for CC41 Unit # 0

NODE ADDRESS	NODE TYPE	NODE SIZE	PRIMARY SECONDARY	FRAME MASTER	COMMON CARRIER CLOCK
0	CC41	144	PRIMARY	Yes	No
0	CP41	24	SECONDARY	No	No
24	CP41	24	SECONDARY	No	No
48	CP41	24	SECONDARY	No	No
72	CP41	24	SECONDARY	No	No
96	CP41	24	SECONDARY	No	No
120	CP41	24	SECONDARY	No	No

The T1 nodes are properly configured

Do you wish to display CC41 switch settings?[Y,N(N)]>>> **Y<return>**

These are the switch settings since the last restart:
  NOTE: 0=open, 1=closed, x = NOT READABLE (normal condition)

CC41 UNIT #0

SWITCH					POSITION					
NUMBER	1	2	3	4	5	6	7	8	9	10
1	0	0	0	0	0	1	0	0	0	1
2	x	0	0	0	0	0	0	1		
3	0	1	0	0	0	0	1	0	x	x
4	1	1	1	0	0	0	0	0		
5	x	x	x	x	x	x	x	x		
6	0	0	0	0	0	0	0	0		

Select Loopback Mode:
  1 - Internal
  2 - External One-to-One
  3 - External Staggered Odd-Odd, Even-Even

 Your selection ? [DEC - 1, 3, (1)]>>> **3<return>**

For line and emulation selection masks, Bit 0 "ON" selects line/emulation 0, Bit 1 "ON" selects line/emulation 1, etc.

Enter emulation selection mask: [HEX - 0, 3FFFF, (3FFFF)]>>> **<return>**

Do you wish to alter the line selection masks ? [Y,N(N)]>>> **Y<return>**

Enter line selection mask for emulation #0: [HEX 0,FF,(FF)]>>> **<return>**
.
.
.
Enter line selection mask for emulation #17: [HEX 0,FF,(FF)]>>> **<return>**

Do you wish to re-display the autosize map ? [Y,N(N)]>>> **<return>**

Enter the soft error limit per line per test [DEC - 0,100,(100)]>>> **<return>**

TEST # 1 MASTER RESET & REGISTER ADDRESSABILITY dd-mmm-yyyy
.
.
.
TEST 26 - TERMINAL ECHO dd-mmm-yyyy time

 Test skipped, test must be explicitly invoked by start command

SUMMARY REPORT:
  TOTAL # ERRORS = 0 (0 SYSTEM, 0 DEVICE, 0 HARD, 0 SOFT)
  DD-MMM-YYYY TIME

DETECTED T1 ERRORS:

CC41 UNIT   #000

REPORTING NODE	SYNC LOSS	TRUNK QUALITY
CC41	0	0
0	0	0
24	0	0
48	0	0
72	0	0
96	0	0
120	0	0

EVM>

2.2.3.2 Detailed Startup Description

This section describes in greater detail each of the fields that the
IUC41F diagnostic displays during startup.

> **EVM> START<return>**
> Enter START at the EVM prompt to begin test execution. There
> are several modifiers that may also be entered at this time,
> such as **test numbers, number of passes,** etc. Reference the
> EVM User's Guide (Emulex Publication VX9950901) for a
> complete list of modifiers.

> **IUC41F, EMULEX VAX-UNIBUS CS41F INSTALLATION AND VERIFICATION**
> This identifying header displays the program name and its
> revision level.

> **Searching for NXM, please wait...**
> Upon initial start-up the program searches the system's main
> memory for non-existent memory for use with the DMA NXM
> detection test. This search occurs only at the time of first
> start-up.

> **This diagnostic uses an autosizer to locate all DMFs on the
> selected UBA...**
> The response to this prompt determines where the autosizer
> will begin searching for CS41F DMFs. An affirmative answer
> **(Y)** will begin the search from the operator-supplied CS41F
> base address, while responding negatively **(N)** will begin the
> search at location 760000. This feature is useful when more
> than one CS41F T1 link is installed in the system, as the
> diagnostic can only test 18 DMF equivalents or 144 lines each
> time it is started. To test the second CS41F, use "SET
> CONFIG/CSR:" to set the starting address of the second CS41F.
> Answer "Y" to the prompt.

Do you wish to display the autosize map ?
Answering affirmatively causes the display of data acquired during autosize.

DMF ADDRESS = 760340
This is the base DMF address of the autosizer located on the UNIBUS.

FIRMWARE REV LEVEL = 000
This field indicates the firmware revision level of the CC41 controller. It appears only within the display for the first emulation (BASE ADDRESS) of the CC41 controller.

CC41 UNIT # 0
This field displays the CC41 unit number. This is necessary if multiple CC41 controller boards exist per T1 link.

DMF EMULATION   # 000   LINE # 0 1 2 3 4 5 6 7
This field is a header which indicates the logical versus physical relationship of the DMF emulation and the CP41 panels, since testing is performed through the UNIBUS register set relative to the DMF emulation and line number.

T1 NODE ADDRESS #000 CHANNEL # 0 1 2 3 4 5 6 7
The T1 node address is the first of the contiguous T1 channel slots used by the node. With 24 channel capacity per CP41 panel, there are six possible addresses: 0, 24, 48, 72, 96, and 120.

The channel number field is relative to the node (panel) displayed. For a 24 channel CP41 panel, the range is 0 through 23.

Note that if the T1 link information is not available because the link is down, or if the associated secondary does not exist for the primary displayed, a message indicating such will be substituted for the NODE ADDRESS and CHANNEL # data.

MODEM CONTROL AVAILABLE [Y,N]   Y Y Y Y Y Y Y Y
This field represents whether or not modem control is available for the current emulation on a per line basis. The modem control test conditionally uses this information to control modem signal testing. Note that Y means "yes" (modem control available), and N means "no" (no modem control board available).

S(elected)/D(eselected)   S S S S S S S S
This field represents the state of the line mask for the current emulation on a per line basis (also see line mask description below). Note that S indicates selection, and D indicates deselection.

Do you wish to display T1 Node Parameters? [Y,N(N)]>>> Y<CR>
An affirmative answer displays the following chart:

NODE ADDRESS	NODE TYPE	NODE SIZE	PRIMARY SECONDARY	FRAME MASTER	COMMON CARRIER CLOCK

with the following definitions:

- **NODE ADDRESS -**
  The T1 node address is the first of the contiguous T1 channel slots used by the node. With 24 channel CP41 panels, there are six possible addresses: 0, 24, 48, 72, 96, and 120.

- **NODE TYPE -**
  There are four possible node types: CC41, CP41, NONE and UNK, which indicates the node is unknown or foreign to the CS41F T1 protocol.

- **NODE SIZE -**
  This is the number of contiguous T1 channel slots used by the node, which is 24 for a CP41 node and 24 to 144 for a CC41.

- **PRIMARY/SECONDARY-**
  This field indicates whether the displayed node is the primary or the secondary per T1 protocol standards. There must be a primary and a corresponding secondary for each node address on the link. The operator examines this field to determine inconsistencies such as dual primaries or dual secondaries for a node, a primary node without a secondary, etc.

- **FRAME MASTER -**
  This field indicates whether the displayed node is a frame master per T1 protocol standards. There can only be one frame master on the link. The operator examines this field to determine whether multiple frame masters exist on the link.

- **COMMON CARRIER CLOCK -**
  This field indicates whether the displayed node is set for common carrier clock per T1 protocol standards. There can only be one clock source on the link. The operator examines this field to determine whether common carrier clock is selected for the displayed mode.

The T1 nodes are properly configured
This message is displayed if the autosizer discovers no T1 configuration errors. In the event errors are discovered, the autosizer does not display this message. Instead it attempts to display in English the discovered configuration error(s). Refer to the above parameter descriptions for information concerning proper configuration.

Do you wish to display CC41 switch settings?
    Answering (Y) to this prompt displays the switch settings for the CC41 controller, where "1" indicates a **closed** switch, "0" indicates an **open** switch, and "x" indicates the switch is not readable by the diagnostic (this is a normal condition and should not be construed as an error).

Select Loopback Mode:
    The menu provides three choices of loopback mode. Install external loopback connectors properly. Refer to section 1.2.3 and Appendix A for more information concerning loopback connectors. Note: This question is still asked for tests 25 and 26, even though loopback mode is not necessary for these two tests.

Enter emulation mask:
    The default field in parentheses is the representation of the number of autosized emulations (Range = 0 for no emulations to 3FFF for 18 emulations or 144 lines). The operator may change this mask for any one of a number of reasons, such as isolating a failing CP41 panel or to compensate for a inadequate number of loopback connectors. For example, Bit 0 "ON" enables emulation 0, Bit 1 "ON" enables emulation 1, etc.

Do you wish to alter the line masks ?
    Responding affirmatively (Y) to this prompt causes the program to prompt for line masks for all selected emulations. The initial default value is FF hex which tests all eight lines of the emulation. By use of the emulation and line masks, the operator can isolate one line or a group of lines for testing.

Enter line mask for emulation #n:
    The allowable response to this prompt is in the range of 0 (no lines) to FF (all eight lines), where each bit position corresponds to a unique line number; i.e., bit 0 and line 0, bit 1 and line 1, etc. For example, 14_{16} would enable lines 2 and 4.

Do you wish to re-display the autosize map ?
    This prompt is for the operator who wishes to check the accuracy of the emulation and line masks. Note that emulations deselected by the emulation mask will still be displayed in the map but the lines will indicate that they have been deselected.

Enter the soft error limit per line per test:
    This prompt is for the operator who has a hard copy console terminal, and who wishes to run the diagnostic overnight and save paper in the event errors are detected. The operator enters a number between 0 and 100 inclusive which is the number of soft errors displayed on a per line per test basis.

```
DETECTED T1 ERRORS:
CC41 UNIT           #000
REPORTING    SYNC    TRUNK
  NODE       LOSS    QUALITY
--------------------------
```

        IUC41F displays this summary report at the end of the program
run. The operator uses this report to check the integrity of
all nodes on the T1 link. With the exception of the CC41
Sync Loss field, displayed fields do not actually tally the
number of errors. Instead they only indicate that an error
has occurred. The Sync Loss field for the CC41 displays the
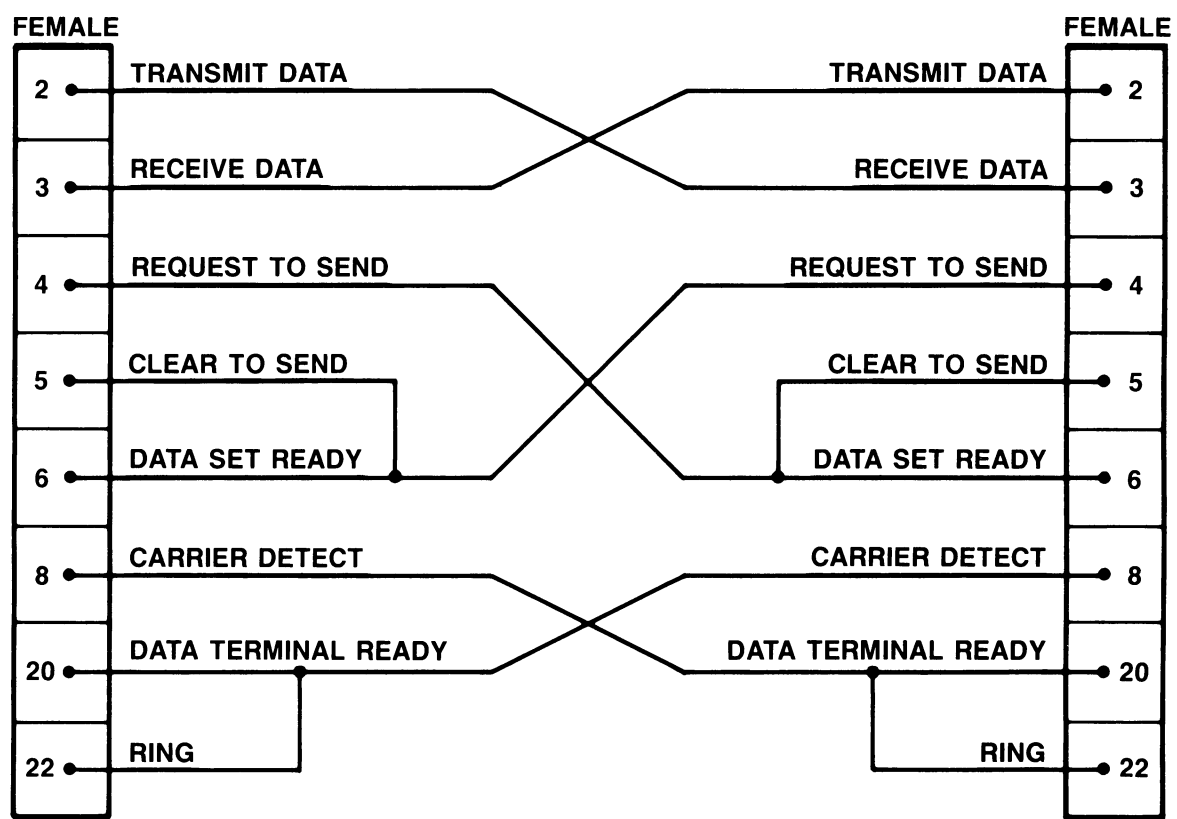total number of Sync Loss errors detected by the CC41.

Emulex thoroughly tests its products. If IUC41F indicates a malfunction in the CS41F subsystem or if you have trouble with IUC41F itself, contact Emulex or its representative.

In the continental United States, Alaska, and Hawaii contact:

Emulex Technical Support
3545 Harbor Boulevard
Costa Mesa, CA 92626
(714)662-5600 TWX 910-595-2521
(800)854-7112 Outside of California only

Outside the United States, contact the distributor from whom the product was initially purchased.
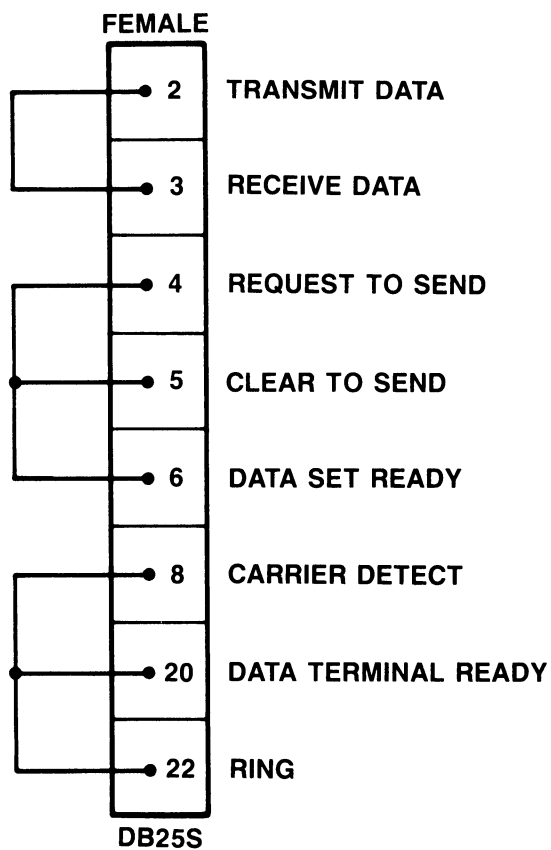
BLANK

FEMALE

| | | | FEMALE |

2 — TRANSMIT DATA   TRANSMIT DATA — 2

3 — RECEIVE DATA   RECEIVE DATA — 3

4 — REQUEST TO SEND   REQUEST TO SEND — 4

5 — CLEAR TO SEND   CLEAR TO SEND — 5

6 — DATA SET READY   DATA SET READY — 6

8 — CARRIER DETECT   CARRIER DETECT — 8

20 — DATA TERMINAL READY   DATA TERMINAL READY — 20

22 — RING   RING — 22

EMULEX PART NUMBER CU4111206

CS4101-0794

Figure A-1.   Staggered Loopback Connector

FEMALE

Pin	Signal
2	TRANSMIT DATA
3	RECEIVE DATA
4	REQUEST TO SEND
5	CLEAR TO SEND
6	DATA SET READY
8	CARRIER DETECT
20	DATA TERMINAL READY
22	RING

DB25S

EMULEX PART NUMBER CU4110201

CS4101-0796

Figure A-2.   EIA Wrap-Around Connector